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Jawaharlal Nehru

“Step Out From the Old to the New”

IS 8783-4-3 (1995): Winding Wires for Submersible Motors, Part 4: Individual Wires, Section 3: Polyester and Polypropylene Insulated Winding Wires [ETD 33: Winding Wire]



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Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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भारतीय मानक

निमज्जन मोटरों के वाइंडिंग तार – विशिष्ट

CONFIRMED 21.25

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अनुभाग 3 पालियेस्टर और पालिप्रोपीलीन से घित वाइंडिंग तार

(पहला पुनरीक्षण)

Indian Standard

WINDING WIRES FOR SUBMERSIBLE MOTORS — SPECIFICATION

PART 4 SPECIFICATION FOR INDIVIDUAL WIRES

Section 3 Polyester and Polypropylene Insulated Winding Wires

(*First Revision*)

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

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Price Group 2

FOREWORD

This Indian Standard (Part 4/Sec 3) (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Winding Wires Sectional Committee had been approved by the Electrotechnical Division Council.

This standard was originally published in 1978 covering PVC insulated winding wires for submersible motors for 85°C operation. Two other standards on winding wires for submersible motors, namely, IS 10051 : 1981 'Specification for PVC insulated winding wires for submersible motors for 105°C operation' and IS 12788 : 1989 'Specification for PVC insulated winding wires overcoated with nylon for submersible motors' have also been in vogue.

In the recent past there has been demand from the industry to make comprehensive revision of the existing standards on winding wires for submersible motors and also to include other types of insulation which are being extensively used in manufacture of winding wires for submersible motors. In view of this the new series of winding wires standards for submersible motors is being brought out as follows:

IS 8783	Winding wires for submersible motors — Specification
(Part 1) : 1995	Conductor data
(Part 2) : 1995	Materials for dielectric and jacket
(Part 3) : 1995	Methods of tests
(Part 4/Sec 1) : 1995	Specification for individual wires, Section 1 HR PVC insulated winding wires
(Part 4/Sec 2) : 1995	Specification for individual wires, Section 2 Crosslinked polyethylene insulated and polyamide jacketed wires
(Part 4/Sec 3) : 1995	Specification for individual wires, Section 3 Polyester and polypropylene insulated winding wires

With the publication of these standards the requirements of PVC insulated wires will be covered in Part 4/Sec 1 of this series, and two new types of insulation, namely, XLPE insulated and polyester and polypropylene insulated wires have also been covered in this series.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

AMENDMENT NO. 1 FEBRUARY 2000
TO
IS 8783 (PART 4/SEC 3) : 1995 WINDING WIRES FOR
SUBMERSIBLE MOTORS — SPECIFICATION

PART 4 SPECIFICATION FOR INDIVIDUAL WIRES

Section 3 Polyester and Polypropylene Insulated Winding Wires

(First Revision)

(Page 1, clause 4.2, last sentence) — Delete.

(Page 1, clause 5.2) — Delete.

(Page 3, clause 6.1) — Substitute 'spool/reel/coil' for 'spool/reel'.

[Page 3, clause 6.1(d)] — Substitute 'spool/reel/coil' for 'spool/reel'.

[Page 3, clause 6.1(c)] — Substitute 'spool/reel/coil' for 'spool/reel'.

(ETD 33/T-57

*Indian Standard***WINDING WIRES FOR SUBMERSIBLE
MOTORS — SPECIFICATION****PART 4 SPECIFICATION FOR INDIVIDUAL WIRES****Section 3 Polyester and Polypropylene Insulated Winding Wires***(First Revision)***1 SCOPE**

1.1 This standard (Part 4/Sec 3) covers the requirements of high conductivity annealed solid and stranded copper conductor with polyester and polypropylene insulated winding wires for submersible motors.

1.2 The wires covered in this standard are suitable for use where the combination of ambient temperature and temperature rise due to load results in conductor temperature not exceeding 105°C.

2 REFERENCES

The following Indian Standards are necessary adjuncts to this standard:

<i>IS No.</i>	<i>Title</i>
8783 (Part 1) : 1995	Winding wires for submersible motors — Specification: Part 1 Conductor data (<i>first revision</i>)
8783 (Part 2) : 1995	Winding wires for submersible motors — Specification: Part 2 Materials for dielectric and jacket (<i>first revision</i>)
8783 (Part 3) : 1995	Winding wires for submersible motors — Specification: Part 3 Methods of tests (<i>first revision</i>)

3 GENERAL

3.1 The tests on insulated winding wires shall be carried out in accordance with IS 8783 (Part 3) : 1995.

3.2 Conductors for this type of wires shall conform to IS 8783 (Part 1) : 1995.

3.3 Requirements of dielectric materials shall conform to Type 3 of IS 8783 (Part 2) : 1995.

4 REQUIREMENTS**4.1 Thickness of Insulation**

The minimum thickness of insulation shall not be less than the minimum value (ti) specified in Tables 1 and 2 as relevant

4.2 Application of Insulation

The insulation shall be so applied that it fits closely on the conductor and it shall be possible to remove it without damage to the conductor. It shall be possible to separate polyester and polypropylene layers.

4.3 Colour

The colour of insulation of winding wire shall be natural.

4.4 Overall Diameter

The overall diameter of winding wire shall not exceed the maximum value specified in Tables 1 and 2.

4.5 High Voltage Test (Water Immersion Test)

The wires shall withstand the test at room temperature when an ac voltage of 3 kV at frequency of 50 Hz is applied for one minute after immersion of the wire for minimum 12 hours in water.

4.6 The overall surface of finished winding wires shall be reasonably smooth.

5 PACKING

5.1 The winding wire shall either be wound on spools/reels conforming to IS 482 : 1981 or supplied in coils packed and labelled.

5.2 The packing length shall be agreed to between the purchaser and the manufacturer.

Table 1 Insulation Thickness and Overall Diameter of Wires with Round Solid Conductor
(Clauses 4.1 and 4.4)

Cross- Sectional Area	Nominal Conductor Diameter	Thickness of Insulation, (t_1)			Overall Diameter, Max
		Thickness of Polyester, Min mm	Thickness of Polypropylene, Min mm	Total Thickness of Insulation, Min mm	
mm ² (1)	mm (2)	mm (3)	mm (4)	mm (5)	mm (6)
0.125	0.4	0.05	0.10	0.20	0.90
0.159	0.45	0.05	0.10	0.20	0.95
0.196	0.5	0.05	0.10	0.20	1.00
0.238	0.55	0.05	0.10	0.20	1.05
0.283	0.6	0.05	0.10	0.20	1.10
0.332	0.65	0.05	0.10	0.20	1.15
0.385	0.7	0.05	0.10	0.20	1.20
0.442	0.75	0.05	0.10	0.20	1.25
0.502	0.8	0.05	0.10	0.20	1.30
0.638	0.9	0.05	0.10	0.20	1.40
0.769	0.95	0.05	0.10	0.20	1.45
0.785	1.0	0.05	0.10	0.20	1.50
0.850	1.1	0.05	0.10	0.20	1.60
1.13	1.2	0.05	0.10	0.20	1.70
1.33	1.3	0.05	0.10	0.20	1.80
1.54	1.4	0.05	0.15	0.25	2.00
1.77	1.5	0.05	0.15	0.25	2.10
2.01	1.6	0.05	0.15	0.25	2.20
2.27	1.7	0.05	0.15	0.25	2.30
2.54	1.8	0.05	0.15	0.25	2.40
2.84	1.9	0.05	0.15	0.25	2.50
3.14	2.0	0.05	0.15	0.25	2.60
3.46	2.1	0.05	0.15	0.25	2.70
3.80	2.2	0.05	0.15	0.25	2.80
4.15	2.3	0.07	0.17	0.30	3.10
4.52	2.4	0.07	0.17	0.30	3.20
4.91	2.5	0.07	0.17	0.30	3.30
5.31	2.6	0.07	0.17	0.30	3.40
5.73	2.7	0.07	0.17	0.30	3.50
6.16	2.8	0.07	0.17	0.30	3.60
6.61	2.9	0.07	0.17	0.30	3.70
7.67	3.0	0.07	0.17	0.30	3.80
7.55	3.1	0.07	0.17	0.30	3.90
8.04	3.2	0.07	0.17	0.30	4.00
8.55	3.3	0.07	0.17	0.30	4.10
9.08	3.4	0.07	0.17	0.30	4.20
9.62	3.5	0.07	0.17	0.30	4.30
10.18	3.6	0.10	0.20	0.35	4.50
10.75	3.7	0.10	0.20	0.35	4.60
11.34	3.8	0.10	0.20	0.35	4.70
11.95	3.9	0.10	0.20	0.35	4.80
12.57	4.0	0.10	0.20	0.35	4.90
13.20	4.1	0.10	0.20	0.35	5.00
13.85	4.2	0.10	0.20	0.35	5.20
15.21	4.4	0.10	0.20	0.35	5.40
16.62	4.6	0.10	0.20	0.35	5.50
18.10	4.8	0.10	0.20	0.35	5.70
19.64	5.0	0.10	0.20	0.35	6.00

Table 2 Insulation Thickness and Overall Diameter of Wires with Stranded Conductor
(*Clauses 4.1 and 4.4*)

Conductor Composition No. of Wires × Wire Dia mm (1)	Cross- Sectional Area, Nominal mm ² (2)	Nominal Conductor Diameter mm (3)	Thickness of Insulation (<i>t_i</i>)			Overall Diameter mm, <i>Max</i> (7)
			Polyester mm, <i>Min</i> (4)	Polypropylene mm, <i>Min</i> (5)	Total mm, <i>Min</i> (6)	
19×0.49	3.58	2.45	0.07	0.17	0.30	3.1
19×0.52	4.04	2.60	0.07	0.17	0.30	3.3
19×0.55	4.51	2.75	0.07	0.17	0.30	3.4
19×0.58	5.02	2.90	0.07	0.17	0.30	3.6
19×0.61	5.55	3.05	0.07	0.17	0.30	3.8
19×0.64	6.11	3.20	0.10	0.20	0.35	4.0
19×0.68	6.90	3.40	0.10	0.20	0.35	4.2
19×0.73	7.95	3.65	0.10	0.20	0.35	4.5
19×0.78	9.08	3.90	0.10	0.20	0.35	4.7
19×0.82	10.03	4.10	0.10	0.20	0.35	4.9
19×0.90	12.09	4.50	0.10	0.25	0.40	5.6
19×0.94	13.18	4.70	0.10	0.25	0.40	5.8
19×0.97	14.00	4.85	0.10	0.25	0.40	5.9
19×1.00	14.92	5.00	0.10	0.25	0.40	6.1
19×1.04	16.14	5.20	0.10	0.25	0.40	6.3
19×1.10	18.06	5.50	0.15	0.25	0.45	6.6
19×1.16	20.08	5.80	0.15	0.25	0.45	6.9
27×1.00	21.21	6.15	0.15	0.25	0.45	7.3
27×1.10	25.67	6.80	0.15	0.30	0.50	8.2

6 MARKING

6.1 The winding wire shall carry following information marked on the label on spool/reel:

- Reference to this Indian Standard, for example, Ref IS 8783 (Part 4/Sec 3);
- Manufacturer's name, brand name or trade-mark;
- Size of conductor/Maximum overall diameter;
- Length of conductor on spool/reel;
- Number of lengths on spool/reels (if more than one);

f) Country of manufacturer; and

g) Year of manufacture.

6.2 BIS Certification Marking

The product may also be marked with Standard Mark.

6.2.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

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BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones : 323 01 31, 323 33 75, 323 94 02

Telegrams : Manaksanstha
(Common to all offices)

Regional Offices :

Telephone

Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg
NEW DELHI 110002

{ 323 76 17
323 38 41

Eastern : 1/14 C. I.T. Scheme VII M, V. I. P. Road, Maniktola
CALCUTTA 700054

{ 337 84 99, 337 85 61
337 86 26, 337 91 20

Northern : SCO 335-336, Sector 34-A, CHANDIGARH 160022

{ 60 38 43
60 20 25

Southern : C. I. T. Campus, IV Cross Road, CHENNAI 600113

{ 235 02 16, 235 04 42
235 15 19, 235 23 15

Western : Manakalaya, E9 MIDC, Marol, Andheri (East)
MUMBAI 400093

{ 832 92 95, 832 78 58
832 78 91, 832 78 92

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